

REMARKS

Favorable consideration and allowance of the claims of the present application are respectfully requested.

In the present Official Action, the Examiner correctly indicates Claims 1-5 are pending and Claims 6-18 being withdrawn as directed to an unelected species.

In the Official Action, the Examiner then objected to the Abstract of the Disclosure as comprising language that is allegedly not clear and concise. Applicants in response have submitted a new Abstract of the Disclosure with the offending language indicated by the Examiner omitted. Applicants respectfully request removal of the objection to the Abstract.

The Examiner further objected to the Title of the Invention as allegedly not being descriptive and proceeded to suggest an apt title for which the present invention is directed. Applicants in response submit a new Title of the Invention as suggested by the Examiner as follows: A METHOD OF MANUFACTURING HIGH PERFORMANCE COPPER INDUCTORS WITH BOND PADS. Applicants respectfully request removal of the objection to the Title.

Claims 1 and 4 were further objected to as containing minor informalities. In response, applicants have canceled Claim 1 and incorporated the subject matter thereof in amended Claim 4. Care has been taken to address each of the informalities indicated by the Examiner in the amendments and the Examiner is respectfully requested to remove the objection.

Furthermore, Claims 1-5 were rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regards as the invention. Applicants, in the amendments provided

herein, have taken care to ensure that the misleading and confusing recitations indicated by the Examiner have been removed or corrected and the Examiner is respectfully requested to withdraw the rejection of Claim 5.

In the Official Action, the Examiner then rejected Claim 1 under 35 U.S.C. §102(b) as being allegedly anticipated by JP 5-347212 and further rejected Claim 2 under 35 U.S.C. §103(a) as being allegedly unpatentable over the JP 5-347212 reference in view of Ting (US Patent No. 5,300,461). The Examiner further rejected Claim 3 as being unpatentable over the combination of JP 5-347212 and Ting in further view of Barth (US Patent No. 6,730,982).

The Examiner did indicate that Claims 4 and 5 would be allowable if rewritten to overcome the rejections as set forth in the office action and to include all of the limitations of the base claim and any intervening claims.

In response, Applicants cancel Claim 1 and incorporate the whole subject matter thereof into Claim 4, now re-cast in independent form, as setting forth the present invention. The Examiner did indicate that Claim 4 including base Claim 1 presented allowable subject matter.

The recitations of the invention as set forth in amended Claims 4 and 5 are as follows:

Claim 4. (Currently Amended) A method of fabricating a high performance copper (Cu) laminate inductor comprising the steps of:

forming a last metal layer including damascene Cu interconnects in a dielectric, one Cu interconnect including a Cu laminate inductor at the last metal level;

depositing one or more layers of passivation material over the last metal layer damascene Cu interconnects;

patterning terminal vias in the one or more layers of passivation material corresponding to said Cu interconnects, one terminal via including a via corresponding to the Cu laminate inductor over the last metal Cu level of the Cu laminate inductor;

forming a bond pad structure above one of said Cu interconnects including depositing metal for said bond pad and a barrier layer, patterning the metal for said bond pad and barrier layer, and depositing a Cu seed layer atop said bond pad and barrier layer;

depositing and patterning a resist for Cu inductors, and depositing Cu to selectively form Cu in inductor regions at a last metal + 1 Cu level of the Cu laminate inductor over the via and the last metal Cu level, to form the Cu laminate inductor; and,

stripping the resist, etching the Cu seed layer, and selectively depositing a passivating layer on said Cu inductors.

5. (Currently Amended) The method of claim 4, further including:

coating said last metal + 1 level having said Cu inductors and bond pad structure with polyimide, and forming openings to said bond pad; and,

depositing barrier layer metallurgy, and forming solder balls.

It is seen from amended claim 4 that care has been taken to remove all of the offending language indicated by the Examiner in the 35 U.S.C. §112 rejection. It is noted that, in the amendment, the applicants have removed indications of the steps a. – f. in the original Claim 4. Amended Claims 4 and 5 now recite the method steps of the invention that closely track the fabrication steps as depicted in Figs. 1A-1H of the present application with care taken to ensure that no new matter is being entered.

For instance, the amended Claim 4 recitation “forming a last metal layer including damascene Cu interconnects in a dielectric” was original Claim 4 step a., and the recitation “one Cu interconnect including a Cu laminate inductor at the last metal level” was originally in canceled Claim 1. This recitation tracks Fig. 1A. The following recitation “depositing one or more layers of passivation material over the last metal layer damascene Cu interconnects” is from original Claim 4, step b. and tracks Fig. 1B. The next method step recitation “patterning terminal vias in the one or more layers of passivation material corresponding to said Cu interconnects, one terminal via including a via corresponding to the Cu laminate inductor over the last metal Cu level of the Cu laminate inductor” is from original Claim 4, step c. and canceled Claim 1 and tracks Fig. 1C. The next method step recitation directed to “forming a bond pad structure above one of said Cu interconnects including depositing metal for said bond pad and a barrier layer, patterning the metal for said bond pad and barrier layer, and depositing a Cu seed layer atop said bond pad and barrier layer” is, in part, from original Claim 4, step d. and tracks Fig. 1D. The next method step recitation directed to “depositing and patterning a resist for Cu inductors, and depositing Cu to selectively form Cu in inductor regions at a last metal + 1 Cu level of the Cu laminate inductor over the via and the last metal Cu level, to form the Cu laminate inductor” is from both original Claim 1 and Claim 4, step e. and tracks Fig. 1E. The next method step recitation directed to “stripping the resist, etching the Cu seed layer, and selectively depositing a passivating layer on said Cu inductors” is from original Claim 4, step f. and tracks Fig. 1F.

Amended Claim 5 now includes recitations from original Claim 5 (with offending language removed) and tracks Figs. 1G-1H.

Claim 2 is being amended to change its dependency in view of the cancellation of Claim 1.

Claims 6 -18 have been withdrawn.

In view of the foregoing, this application is now believed to be in condition for allowance, and a Notice of Allowance is respectfully requested. If the Examiner believes a telephone conference might expedite prosecution of this case, it is respectfully requested that he call applicant's attorney at (516) 742-4343.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Steven Fischman", followed by a long horizontal line extending to the right.

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